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GEOGRAPHICAL RECORD.

AFRICA.

AFRICAN FORESTS.—Germany has adopted forestry regulations for her Togo colony. The Togo Government recently reported that a large part of the colony covered with forest a century ago has been denuded of its trees till these regions have taken on a steppe-like character, and evaporation has been so largely increased that the dry season reaches the proportions of a drought. Rules for the protection of the remaining forests have therefore been adopted. An area of 112 square miles is to be planted with trees every year and premiums have been offered to plantation companies and missionary societies to encourage the planting of some of the most useful trees:

Mr. Walter Busse in a recent article on the destruction of timber in tropical Africa attributes the practice to the fact that the natives do not fertilize their tilled lands, but abandon them as soon as their productive capacity declines for new lands which they have meanwhile prepared for use. They kill trees on the edge of the forest by girdling them with gashes or stripping off the bark, cut down the dense undergrowth around them and in the dry season set fire to the brush, dead trees as well as the scrub being consumed. The ashes help to produce fine crops and another clearing is begun, in readiness to replace the new farm when it in turn begins to fail.

The deforestation of the country has been enormous wherever the population is dense. There is abundant evidence, Mr. Busse says, that a vast forest once extended from Sierra Leone to the Equator, most of which has been destroyed by man. One of the colonial Powers has now taken the first steps to change this course of things and to repair some of the damage done.

DEVELOPMENT ON THE ATLANTIC BORDER OF THE SAHARA.—The Governor General of French West Africa, according to *Globus* (Vol. 94, No. 4), is striving to develop the fisheries along the Atlantic coast in the neighbourhood of Cape Blanco. The French harbour of Port Etienne, founded some years ago, is gradually growing and promises much importance, though potable water is obtained only by distillation. The coastal waters are very rich in fish and it is expected that the new fisheries recently established will make a valuable addition to the fish resources of France. One company is already engaged in the business, others are to follow, and Breton fishermen at Port Etienne are making large catches. Good caravan routes extend from this point into the desert to the east, north to Morocco, and south to Senegal.

THE GORGE OF THE ZAMBEZI.—It is now a well-known fact that the Victoria Falls of Rhodesia owe their peculiar character to the action of the water on a series of much-jointed lavas. Less is known about the gorge below the Falls. Accordingly, an article from so able a pen as that of G. W. Lamplugh (Geographical Journal, Vol. xxxi, 1908, pp. 133-152 and 287-303) is especially important. In it he describes in some detail the results of an exploration of a few weeks in the summer of 1905, made at the request of the Council of the British Association. The gorge is described in considerable detail, and also some of the tributaries to it, and there are some excellent photographic views from which the characteristics of the gorge are easily seen. Livingstone ascribed the remarkable zig-zag gorge immediately below the Falls to sudden rending of the earth's crust, but Lamplugh agrees with Molyneux that it is purely the result of erosion guided by rectangular joint planes. He says "every part of the cañon that I visited bore out the conclusion that it is a valley of erosion; and I found excellent illustrations . . . . of the mode in which the curious zig-zags are developed, both in the main gorge and in its laterals, through the differential excavation that ensues when vertical planes of weakness traverse the rocks." R. S. T.

AMERICA.

A NEW MAP OF THE UNITED STATES COAL FIELDS.—The U. S. Geological Survey has just published a map in colours, scale about 110 miles to an inch, "Coal Fields of the United States," by Marius R. Campbell. A long explanation of the map and statistical tables fill the margins. In the last few years many new data have been collected, important coal fields have been surveyed and new fields discovered. The new map, therefore, differs much from its predecessors. New coal fields appear, the boundaries of old fields are revised and large areas are shown where the existence of coal has been established, though at present it is not accessible. The qualities of the product of the fields are differentiated by symbols, and the distinction made between the various grades of coal is, from the commercial point of view, the most important feature of the map.

In his explanatory text, Mr. Campbell says it is now known that vast quantities of coal in the western States are deeply buried under sediments, so that little effort to reach the fuel is likely to be made until more accessible beds are exhausted. For the first time, the coal or lignite in the deep river basins of Colorado, Montana, Wyoming, and North Dakota is represented on the map. Mr. Campbell says the fields of Washington are doubtless much larger than the map

indicates, buf large parts of them are so covered by glacial gravel and heavy timber that it is impossible, as yet, to discover their volume and extent.

The Geological Survey recognizes these six classes: (1) anthracite, (2) semi-anthracite, (3) semi-bituminous, (4) bituminous, (5) sub-bituminous (black lignite) and (6) lignite. The first four are grouped as high-grade coals and are shown on the map in gray. Sub-bituminous coal is represented by olive green and lignite, the lowest grade, by yellow. The areas are also differentiated according as they contain workable coal beds, may contain them or contain them under such heavy cover as not to be available at present. The limit of workable depth is based on the actual working conditions in Europe, and especially in Belgium, where the limit is fixed at 3,000 feet for coal and 1,000 feet for lignite. The minimum minable thickness of bed is fixed at twenty inches for coal and three feet for lignite.

According to the figures given, the area of the more accessible coal fields in the United States is about 327,000 square miles, and they carry an estimated content, available without excessive cost for future use, of nearly 2,000,000,000 tons. Of course, the rate of consumption cannot be predicted with certainty, but even if it increases at the marvellous rate of the last fifty years, the supply of easily available coal will not be exhausted until the middle of the next century. This is a more cheerful view of the future of our coal industry than is presented in other recent estimates.

ANTIQUITY OF MAN IN AMERICA.—*Bulletin* 33 of the Bureau of American Ethnology deals with this question. It comprises the report of Dr. H. Hrdlicka, an accomplished student of human osseous remains, who has made a careful study of the fourteen specimens or groups of specimens found in North America that seemed to indicate the presence of early man. The first of these specimens, the New Orleans bones, were discovered in 1844, and the remains known under the name of the Nebraska loess man were unearthed from 1894 to 1906. Mr. Hrdlicka discusses these finds of human remains, for which geological antiquity has been claimed, in considerable detail.

His general conclusion is that the somatological evidence in each case bears witness against the geological antiquity of the remains and for their close affinity to or identity with those of the modern Indian. Only one idea is justified by these facts and that is that on this continent no human bones of undisputed geological antiquity are known. Early man may have existed in this country, but convincing proof of the fact still remains to be produced. In spite, however, of the repeated failures to obtain satisfactory evidence of man's antiquity in America, there is reason to encourage renewed, patient, and scientifically conducted exploration:

> A satisfactory demonstration of the presence of a geologically ancient man on this continent would form an important link in the history of the American race and of mankind in general. The Missouri and Mississippi drainage areas offer exceptional opportunities for the discovery of this link of humanity, if such really exists.

Mr. Hrdlicka mentions a consideration of far-reaching significance, adding strength to the belief that man's introduction into America must have taken place in a comparatively recent geological period. Man appeared in the Old World, probably during the Tertiary period, through differentiation from the primates, the class of animals to which he presents the closest structural analogies. Primates of the higher forms were not found in America; they existed only in the

warmer parts of Asia, Africa and Europe, and it is there that we must look for the first traces of man's appearance:

> Accepting this view, it follows that America was peopled by immigration from the Old World which could not have taken place until after great multiplication and wide distribution of the human species and the development of some degree of culture. This implies a vastly later date than that assigned to man's origin. A wide dispersion of the race over the earth could hardly have taken place before the later stages of the caenozoic era.

The Report says that in considering the question of the appearance of man in America, special interest attaches to the Pleistocene, during several phases of which period man is known to have existed in central and western Europe; there is absolutely no indication that he reached the American continent before that time.

GEOGRAPHICAL INFLUENCE IN THE DEVELOPMENT OF NEW JERSEY.—In the *Journal of Geography* (Vol. VI, 1908, pp. 177-182) Mr. R. H. Whitbeck has given us a clear-cut statement of the geographic factors involved in the development of New Jersey. He points out that a single dominant factor lies at the base of the industrial development of certain sections, *e. g.,* mineral wealth in Pennsylvania, water-power in New England, and a natural waterway in New York. These States depend upon something within their own confines, whereas New Jersey is dependent upon influences operating from outside. It has little mineral, little water-power, little good soil, and a coast line of little value in commerce. Yet New Jersey ranks as one of our foremost industrial States. Although ranking forty-third in area, it ranks sixth in manufacturing, second in *per capita* value of manufacture, and easily first in percentage increase of manufacturing between 1890 and 1900. Land of little value for farming sells at $1,000 an acre, and swamp lands a short time ago valued at no more than five dollars an acre now sell for $5,000 an acre. Side by side are the people who have eked out a scanty existence on sandy or rocky soil, and wealthy city people who make the poorest of land the seat of their magnificent country homes. The coast line presents the same contrast of the shanties of the Baymen, until recently isolated, and the homes of the wealthy city folk side by side.

Mr. Whitbeck shows very clearly that this condition is the result of *"the influence of geographical position"* between the great cities of New York and Philadelphia. He concludes his most interesting and valuable paper in the following words: "Whether we consider the State's development in agriculture, in transportation, in manufacturing, in the value of real estate, in the growth of sea-side resorts, in the range of prices or of salaries, we find the same dominant influence everywhere. The material growth of the State finds its stimulus not primarily in its own resources, *but in its geographical position* between two great States, two great cities, two great harbours, whereby it shares in the prosperity, the wealth, and the opportunities of both." R. S. T.

WATERS OF THE GREAT LAKES.—About two years ago, the U. S. Geological Survey, began a study of the waters of the Great Lakes. For a year samples were collected each month from each lake at a point where the water would probably represent the normal quality of the discharge. The waters were shipped to the water-testing laboratory of the Survey at Washington, where they were analyzed.

The Lake Superior water was found to be least strongly mineralized. Lake

Michigan is twice as high in total solids, and Lake Huron is but little less mineralized than Lake Michigan. Lakes Erie and Ontario are practically alike in mineral content, holding about 2½ times as much solids in solution as Lake Superior. Reason for the striking difference in the lake waters is found in the character of the geologic formations in the drainage basins tributary to them. The crystalline and igneous rocks—granite, schist, gneiss, and basalt—that predominate all around Lake Superior are not easily soluble, and hence the lake receives few affluents bearing large quantities of dissolved matter; Lake Michigan and Lake Huron, on the other hand, receive drainage from limestones and sandstones of the sedimentary series and contain a much greater proportion of mineral matter. Dilution by the softer water of Lake Superior probably accounts for the fact that Lake Huron water is less mineralized than that of Lake Michigan. It is probable that forestation, sedimentation, and relation of rainfall to run-off also affect the relative composition of the lake waters.

Mr. R. B. Dole, under whose direction the analyses were made, says that the lakes are almost invariably softer than their affluents. The reason is apparent; as the lake surfaces are large in proportion to their corresponding land drainages, a great part of the rain falls directly into the lake waters and dilutes them; on the other hand, rain falling upon the land becomes more or less impregnated with mineral salts before it reaches the lakes in the normal run-off.

A study of all the data leads to the conclusion that the lake waters may be especially recommended for industrial and domestic uses wherever they can be economically obtained. They are low in mineral content and normally free from turbidity.

THE GEOLOGICAL SURVEY OF OHIO is accomplishing several things which will be of interest and advantage to geographers. The geologic map is to be revised and re-issued. The last edition is a small map in Volume VII, dated 1893. The new map will show, in addition to data on former maps, the outcrop of the Pittsburg coal in Ohio, which was mapped in the summer of 1907 by the Director and assistants, the contact of the Lorraine and Richmond formations of the Lower Silurian now being mapped by A. Foerste and assistant, and a number of minor additions and corrections.

A series of educational bulletins is outlined and three numbers are in preparation. One is a Preliminary Report on the Physiography of Ohio, consisting of a description and discussion of the physical features of the State, prepared by George D. Hubbard; another discusses the geologic, glacial, shore-line and stream-made features of the Cleveland district, by F. Carney, F. Van Horn, and H. P. Cushing; the third will deal with the geology, resources, and physiography of the Columbus region, prepared by the Director J. A. Bownocker, C. S. Prosser, G. D. Hubbard, and assistants. The last two of these bulletins will be issued before the general discussion. All are being prepared with the needs of college and secondary teachers and students in mind, and will, it is hoped, prove of considerable value in these schools of the State, as well as to the general reader in the localities covered.

Bulletin IX on the coals of some southeastern counties of the State is now in the hands of the printer. This gives many sections and valuable data concerning the coal deposits in this portion of Ohio. G. D. H.

EDUCATIONAL BULLETIN OF THE ILLINOIS GEOLOGICAL SURVEY.—State geological

surveys began their work largely along stratigraphical lines, as was natural, since stratigraphy was basal in importance. From this the transition to Paleontology was a simple step, and in the early days especially, these two aspects of geology practically monopolized the energies of the staff of the surveys. With the development of our mineral resources State geological surveys naturally undertook to occupy this field. As a result of this history these surveys have allowed other fields of activity to be untouched. The soil, one of the most important of the geological phenomena, has been so completely neglected that its study has passed to other divisions than that of geology, where it belongs. There has been neglect along other lines also, and among these is the field of popular education. Surely it belongs in the province of the State geological surveys to provide information for the schools and the intelligent citizens, as well as for the mining population. There has not been a broad policy in the management of most State geological surveys, otherwise such opportunities would not have been missed. It is, therefore, peculiarly gratifying to see a State geological survey which is at last making provision not merely for pure geological research, paleontology, and economic geology, but also for other phases. This the Geological Survey of Illinois is doing. In educational lines it is making specific provision for educational bulletins, and has a consulting geologist, Prof. R. D. Salisbury, in charge of their preparation. In this way the Illinois Survey is going to perform a service to the State and should set an example to other Surveys.

The first of the Educational Bulletins, number 7 of the general series of Bulletins, has recently been published. It deals with the physical geography of the Evanston region and is thus of interest to the teachers, students and intelligent citizens of a large area, the seat of two important educational centres. The authors, W. M. Atwood of Chicago University and J. W. Goldthwaite of Northwestern University, have presented a first hand discussion of a physiographic region which will be of interest to physiographers of the country as well as to local students. The bulletin is a model, and reflects credit upon those who prepared it, as well as upon the wise policy of the Survey. Would that the people of New York could find some similar work on, let us say, the Hudson River, or Lake George, or the Mohawk Valley, or some of the other interesting parts of the State. R. S. T.

THE OKLAHOMA GEOLOGICAL SURVEY.—The constitution of this new State made it obligatory upon the Legislature to establish a Geological Survey. The first State Legislature placed the Survey under the control of a Commission consisting of the Governor, the State Superintendent of Public Instruction, and the President of the State University. The sum of $15,000 was appropriated for the work. The Commission met on July 25, and elected as Director Dr. Charles N. Gould, head of the Department of Geology, at the State University of Oklahoma. He was instructed to report as soon as possible on the building stone, road material, and oil and gas of the State. Parties are now in the field investigating these resources.

EVOLUTION OF NIAGARA FALLS.—In his review of Dr. J. W. Spencer's monograph "The Falls of Niagara" (*Science,* No. 709), Dr. G. K. Gilbert does not share Spencer's view that the age of Niagara, or the time that has elapsed between the beginning of the cataract at the cliff near Queenston and Lewiston and

the present stage of excavation of the gorge, is about 39,000 years. Dr. Gilbert, after comparing the energy of Niagara with the energy of man-made engines, with river work in carrying detritus, and also contrasting the Canadian Fall with the American, suggests that the efficiency of the Niagara engine producing erosion and recession, instead of being constant, increases with the increase of energy and decreases with the diminution of energy. If the true law were known, its application would probably enlarge the time estimate.

He says that "the Niagara problem resembles other scientific problems in that the enlargement of knowledge leads to the recognition of complexity. It differs from many geologic problems in the great extent of its available data. In all the regions covered by the lakes with whose changes it is concerned, those changes were the latest geologic events, so that their evidences overlie all earlier records. They may not be so plain that 'he who runs may read,' but they are so clear and full that the patient observer can bring together a complete, coherent, demonstrative body of data. As the facts are gradually assembled and interpreted an intricate history is developed, a history interwoven on one side with that of the oscillating and waning ice-sheet, and on the other with that of Niagara. The complete correlation of Niagara and the establishment of its chronology promise not only to tell us its age, but to give fairly definite dates to various events in the later Pleistocene history of eastern North America, and to assist the imagination in its broader conceptions of geologic time."

Some of Our Mineral Products in 1907.—An advance chapter from "Mineral Resources of the United States, 1907," says that the iron ore produced in this country in that year amounted to 51,720,619 long tons, valued at $131,996,147 at the mines. As compared with 1906, the most productive previous year, this was an increase of 8.32 per cent. in tonnage and of 31.21 per cent. in value.

The total production of petroleum amounted to 166,095,335 barrels, an increase of 39,601,399 barrels over the production of 1906, the increase being greater than the total production of petroleum in any year up to 1889. The total value was $120,106,749. The Kansas and Oklahoma field took the first place, California the second, and Illinois the third. The greatest change was in Illinois, where 4,397,050 barrels were produced in 1906 and 24,281,973 barrels in 1907.

The smelter production of copper was 868,996,491 pounds, a decrease of 48,809,191 pounds from 1906.

The salt production amounted to 29,704,128 barrels of 280 pounds, valued at $7,439,551, or $781,201 more than the value of the 1906 output. The country exported nearly 62,000,000 pounds of salt.

Change in the Bulletin of the Bureau of American Republics.—Beginning in July last the Bulletin will hereafter be published in two sections; one completely in English and the other having Spanish, Portuguese and French subdivisions. Heretofore the Bulletin has given nearly one-half of its space under the same cover to duplications in those languages of what also appeared in English.

A Library in Washington.—Errors in appreciation are sometimes of geographical origin. This seems to be the case with a note in the *Literary Gossip*

of the London *Athenæum* of August 29, on the death of Mr. Ainsworth Rand Spofford. The *Athenæum* says that Mr. Spofford

> obtained a post in the Congregational Library at Washington, of which he was chairman from 1864 to 1897.

What is the Congregational Library at Washington and what is the chairman of a library? Mr. Spofford was for many years the librarian-in-chief of the Library of Congress, sometimes called the Congressional Library; but the *Athenæum* knows the difference between *congressional* and *congregational* and may be able to explain what is meant by the chairman of a library.

THE BOUNDARY BETWEEN COLOMBIA AND BRAZIL.—The fourth clause in the Boundary Treaty of 1907 between these two nations has now gone into effect. It gives to each of them the fullest reciprocal liberty to navigate the international rivers and carry their commerce across the new frontier between them. Colombia will be the larger beneficiary by this arrangement because it gives her open waterways by the large Guainia-Rio Negro and Uaupés-Rio Negro affluents to the Amazon and the Atlantic.

The boundary settlement was an agreement upon a scientific frontier following chiefly water courses and water partings in a wholly undeveloped region, so little known that the boundary claimed by each country was chiefly on paper. Not quite all of the boundary is now defined, as a short stretch of it must await for its determination the settlement of the dispute between Colombia and Ecuador.

Geography profits by the studies that have led up to these amicable arrangements. A new map replaces the old hypothetical tracings of the western affluents of the Rio Negro with the real facts. The waterways that constitute the important basin of the Rio Apoporis are mapped for the first time. Commerce and development will gain, because both nations have agreed to co-operate in the improvement of the rivers crossing their border and have made a special convention concerning the navigation of the Putumayo, the second largest of the Amazon's northern tributaries.

ASIA.

MINERAL RESOURCES OF THE PHILIPPINE ISLANDS.—The Bureau of Science, Manila, has published a *Bulletin* by Warren D. Smith, Chief of the Division of Geology and Mines, and members of the staff, on the mineral resources of the islands and their product in 1907. It is believed that a sure, profitable, and steady mining industry may in time be built up in the colony, but this report shows that little more than a beginning has yet been made. Coal has been found in nearly every island of the archipelago, but only 4,545 tons were produced last year. In many places it is associated with petroleum. The coal is pretty much alike throughout the islands, is sub-bituminous, and has the appearance and specific gravity of lignite, with the carbon content and streak of a bituminous coal. The promising coal fields at the present time are in Cebú; the island of Polillo near the east coast of Luzon, about opposite Manila; the southern part of Mindoro and on a small island south of it; Batan island; the northern part of Dinagat Island, Mindanao; and in the northeast corner of Negros.

Petroleum occurs on the east coast of Tayabas province and on the west coast of Cebú. There are hundreds of square miles of excellent limestone with shale

and clay beds, the raw material for cement. Much more lime than is now produced can be made. The quality of the marble in use leaves much to be desired, and as yet there is no good building stone in the Manila market.

In 1907, the amount of gold mined was 4,540 ounces, and up to June of that year, 1,601 lode claims, and 533 placer claims had been filed. Silver is as yet practically a negligible quantity (83 ounces mined in 1907). All the iron yet produced comes from one furnace (436 short tons last year), and the methods are very crude. A map showing the principal mineral districts accompanies the report.

THE PHILIPPINE AGRICULTURAL REVIEW.—This is a new publication of the Bureau of Agriculture for the Philippine Islands. It is issued monthly and is intended to be a popular publication on general agriculture, with reports on agricultural conditions in different parts of the archipelago and articles on tropical agriculture. It is circulated free in the Philippines.

THE BATANES ISLANDS.—The *Philippine Journal of Science* (Vol. 3, No. 1) contains an article on the Batanes Islands by Henry G. Ferguson, dealing especially with their physiographical aspects. The paper is illustrated with maps and photographs. Mr. Ferguson does not follow the spelling of the War Department Gazetteer.

These islands form the most northern portion of the Philippines. They consist of the islands of Isbayat, Batan, Sabtan, and Ibujos, all of which are inhabited, and the uninhabited islands of Y'Ami, Maysanga, Mabudis, Siayan, Inem, and Desquey. Y'Ami, the most northern island, is about 270 kilometers from the nearest point of Luzon, and 160 kilometers from the southern point of Formosa.

The natives form a separate race, speaking their own language or languages, for that of Isbayat is different from the language of the other islands. Professor Scheerer considers the inhabitants of Batan and Sabtan to be of Malay stock, while those of Isbayat are mixed Malayan and Papuan. They are kindly, intelligent, enterprising, and extremely industrious. The two principal islands, Batan and Sabtan, are over-populated, and the arable land is largely taken up, hence there has been considerable emigration and the Batanes people are scattered throughout the Babuyanes islands and Luzon. Before the Spanish occupation the constant warfare between villages made defense the first requisite in the choice of the village site, hence the inhabitants lived on the hill tops, going down to work in the fields by day. With the coming of the Spaniards the hill towns were destroyed and the people moved into sea-coast villages.

The geological structure, upon which the topography of the islands is largely dependent, brings the Batanes into three groups:

1. Islands consisting in great part of the older rocks, volcanic agglomerate with basic dikes. To this group belong Sabtan and the southern part of Batan.

2. The younger volcanic group consisting of Mount Iraya in Batan, the island of Inem and the small islands to the north of Isbayat.

3. The coral limestone group, Desquey, Ibujos and probably Isbayat.

In pre-Miocene times a land mass of considerable extent was built up by enormous explosive eruptions from unknown sources and after the cessation of these explosions was gradually worn down by streams to an extremely mature topography.

The next stage from the Miocene to recent times was one of predominant uplift, limestone containing Miocene fossils being found at elevations up to 275 meters. This period was marked by renewed activity of the streams and the cutting of steep cañons. The *locus* of volcanic activity is now shifted from the region of Sabtan to a line along the 122d meridian.

Faulting between Ibujos and Sabtan cut off part of the old upland, leaving a well-marked fault scarp along the west coast of Sabtan and growth of coral and later elevation brought a limestone mass, of which the islands of Isbayat, Ibujos, and Desquey are remnants, to the surface. The large number of earthquakes in the Batanes indicate that movement along this fault is still going on.

The recent history of the islands is mainly one of lessening of the area. Nothing is being gained through uplift. The growth of coral reefs is the only force acting in opposition to the erosive action of waves, streams, and tides. The work of man in deforesting the ridges is assisting in the wearing down of the land.

THE HANGCHOW BORE.—A very interesting and well-illustrated description of the phenomena associated with the remarkable bore on the funnel-shaped Hang-Chau Bay and the estuary of Tsien Tang Kiang River in China is presented by Dr. Charles K. Edmunds in recent numbers of the *Popular Science Monthly* (Vol. LXXII, 1908, pp. 97-115 and 224-243). The bore rushes up this bay and estuary as a result of the retardation of the tidal rise in the outer portion, causing such a difference in water level in a short distance that a breaking wave is formed at every incoming tide. At its maximum the bore which rushes past Haining is a solid wall of water from two and a half to three miles wide, from ten to twenty feet high and moving at a velocity of from ten to twenty miles an hour. Something like 1,750,000 tons of water are estimated to pass this point in a single minute. Dr. Edmunds' description of the passage of the bore as actually witnessed by him is most vivid, and his photographs clearly show that his word picture is not exaggerated.

Great sea walls have been built along the banks of the bay and estuary. These, begun about 915 A. D., extend for a distance of 180 miles and are among the marvels of ancient Chinese engineering. The construction of this wall, which is very ingenious, is described and fully illustrated by photographs. It effectually protects the banks from the powerful wash of the bore wave, but itself requires constant care and expenditure to keep it from destruction. The bore is naturally a great menace to navigation and quite effectually interferes with steam navigation; but the Chinese junks navigate the bay and estuary in the following ingenious way: Before the coming of the bore they take shelter at some point where the force of the wave is not great, as, for example, at Bore Shelter Bay, protected from the advancing bore wave by a projecting point. As soon as the bore has passed, the tide rises swiftly and a rapid current sets up the bay. On this "after-rush" the junks run swiftly up stream "with all sails set, but with their bows in every direction." As soon as they can get a little steerage way they make for the sea wall and there find a resting place on a platform behind a buttress of brush and piles. There, with the falling tide, they remain stranded until the next bore passes, the wave itself beating violently against the wall below them, and even sending spray over them, but doing no damage. Then comes the after-rush by which they may be safely floated off. It is an interesting and unique instance of the battle of man with his environment, and the conquering of nature in the service of man. R. S. T.

EUROPE.

GRÉPON AGAIN ASCENDED.—Messrs. Otto Reicher, F. Genecand, and F. Monnier (*Natur und Kunst,* June 1 and 15), with three Swiss guides, have recently ascended the Aiguille du Grépon, which has been regarded as one of the most difficult climbs in the Alps. This great square block, with precipitous sides and minaretted tops, is in view on the usual route up the Mer de Glace to Mont Blanc. Its topmost rock is only 11,445 feet above the sea. Above its general rock mass are towers of granite, parts of which are smooth to the touch and offer no hold or grip of any sort. There are cracks in them a few inches wide, but the cracks are likely to have edges as smooth and true as though a stonecutter had hewn them. The result is that the history of the successful ascents of Grépon is very short. Mummery led the way in 1881, and in his four ascents (the last in 1892) he stood on all the more prominent elevations. Miss Bristow, one of the most skillful of women mountaineers, accompanied him on his last ascent. The Frenchman Dunod followed Mummery in 1885. The Austrian and French climbers who are the last to triumph over Grépon are of the same opinion as their predecessors, that the mountain is one of unusual difficulty. The photographs accompanying the paper show graphically the kind of climbing that is required to get to the summits of Grépon.

JAHRBUCH DES SCHWEIZER ALPENCLUB.—Vol. XLIII (1907) maintains the well-earned reputation of this annual. A considerable number of articles are in French, though most of the volume of 549 large octavo pages is written in German. The volume is supplemented by two fine maps (see *New Maps*), a number of beautiful panoramas, plans of new mountaineering huts, and a well-illustrated monograph by Dr. G. Bossard "Schweizer Zinnkannenen," which shows how artistically the Swiss employ one of the humblest but most useful of metals in their manufactures, and also justifies the idea of the editor, Dr. H. Dübi, that themes relating to the culture of Alpine peoples may not inappropriately appear in the *Jahrbuch.*

A number of recent Alpine journeys are described by various writers, and the editor has an interesting section on new journeys in the Swiss Alps, where many ascents have been made by variations from usual routes. The most valuable scientific feature of the volume is the 28th Report (1907) on the periodical variation of the glaciers in the Swiss Alps by Dr. Forel, Prof. Mercanton of Lausanne, Mr. Muret, chief Forestry Inspector, and Mr. Argand, the geologist.

The list of accidents in the Swiss Alps during the year shows that 62 persons, distributed among 55 climbing parties, lost their lives. Rock falls, fog, avalanches, and hail and snow storms were responsible for 15 deaths. The causes of 8 fatalities are not explained. Most of the casualties were due to failure to use ropes, slipping, exhaustion, cold, attempt to make short cuts, new-fallen snow, and inexperience. Five women were among the victims and 17 were young persons scarcely twenty years old. All were tourists, no guide being involved. Seventeen were out on the mountains merely to gather Edelweiss and other flowers.

The reviews of new Alpine publications fill 150 pp., and the volume closes with the Annual Proceedings of the Club and its sections and the financial report. The illustrations include, besides the folded panoramas, 131 half-tones, many of them full-page, which rank among the best specimens of Alpine photography.

AN ALPINE SECTION IN A WOMAN'S CLUB.—The Lyceum Club, one of the women's clubs in London, with a house in Piccadilly, has added an Alpine section to the social, literary, and other interests represented in its membership. The new section has been ushered in with a good list of members, a banquet, and a letter from Margherita, the Dowager Queen of Italy, expressing her warmest wishes for the success of this section. Its President is Mrs. Aubrey Le Blond, a distinguished mountain climber and the author of several books on the Alps.

POLAR.

THE DENMARK GREENLAND EXPEDITION.—In 1906, the Danish Government and private citizens contributed the funds necessary to fit out an expedition to east Greenland under the leadership of Mr. L. Mylius Erichsen. The party sailed from Copenhagen on June 29th of that year. A telegram received about the middle of August from Lieutenant Trolle, master of the *Denmark,* the vessel of the expedition, announced the return of the party to Bergen, Norway, having carried out its main purposes, although this result was dearly paid for. The leader of the expedition and two companions met their death on the Greenland ice cap near the east coast.

On the journey north a harbour for the ship was found in latitude 76° 45′. A sledge party was organized in the spring of 1907 under the command of Mr. Erichsen to explore the unknown part of the northeast coast of Greenland. The expedition consisted of ten sledges in four detachments. Three of these returned before the beginning of summer, and in September, 1907, an expedition was sent out to find the fourth party, which had not come back to the ship. The search was fruitless, but in March of this year a fresh search party brought definite news of the fate of the missing men.

Mr. Erichsen, Lieutenant Hagen and Mr. Brönlund had remained on the north coast of Greenland through the summer, as the state of the weather made sledging back to the ship very difficult. The last rescue party found the body of Mr. Brönlund in a crevice near one of the supply dépôts in about latitude 79° north. By the side of the body were found sketches showing the results of the work accomplished and also the dead man's diary, in which was written the following:

> I am dying in latitude 79° north under the hardships of the return journey over the inland ice in November. I reached this place under a waning moon and cannot go on because of my frozen feet and the darkness. The bodies of the others are in the middle of the fiord. Hagen died on Nov. 15, Mylius Erichsen some ten days later.—JORGEN BRÖNLUND.

Mr. Brönlund's body was buried on the spot where it was found. Lieutenant Trolle says in his telegram: "It was impossible to recover the bodies of the others owing to the heavy fall of snow. We erected a monument at Over Haven, Port Denmark, to the memory of our three dead comrades who perished in doing their duty on the field of honour. Everything possible was done to succor them from the ship, but it was beyond human power to prevent the catastrophe."

The death of Erichsen and his two comrades will be deplored by all who know of the excellent purposes of this expedition and of the good work it achieved. The entire unknown coast of Greenland was carefully explored, and the researches were continued along the north coast as far west as Cape Bridgman, discovered and named by Peary, in lat. 83° 30′. The party saw Peary Channel, which separates Greenland from the archipelago north of it, but the

preliminary report does not show that they entered far into the channel. The coast line was found to take a much more easterly direction than was expected. Connection was made with Peary's landmark on Peary Land and at Cape Glacier, at the eastern end of Peary Channel, the Danish flag was hoisted and the country was taken possession of for Denmark and called King Frederic VIII Land.

One of the purposes of the party was to look for Eskimo remains. The telegram does not report whether any were found, but says that no living people were encountered. At 80° the expedition found open sea close to the coast. In the fall of 1907 and the spring of this year several sledge journeys were made on the inland ice, some of them towards the south as far as Ardencaple Inlet. Scientific expeditions were continuously made into the district surrounding Port Denmark and also from the ship. Large collections were made, including a mass of scientific data and numerous sketches, paintings, and photographs of the country were also made.

The expedition consisted of twenty-seven members, including several men of science and a painter. It was provided with motor boats in addition to the ordinary equipment of Arctic exploration. While Erichsen's main object was to map the unknown part of northeast Greenland, he hoped also to collect a mass of valuable material for the study of ethnological, biological, and even seismological questions.

Erichsen had already made an honourable record in Arctic exploration. During the expedition which occupied him from June, 1902, to November, 1904, he succeeded in making a chart of the hitherto almost unknown shore line of Melville Bay. His latest work nearly completes the outlining of the coasts of Greenland. He was especially interested in efforts to discover by what routes and in what period the Eskimos had made their way into Greenland.

Departure of the Charcot Expedition.—The French Expedition to the Antarctic under the command of Dr. François Charcot left Havre on August 15 in the *Pourquoi Pas,* a vessel especially built for the explorer's purposes. Some 30,000 persons were on the wharves to bid the expedition God-speed. The French Parliament had made a grant of $160,000 for the expedition, and the Prince of Monaco, the Paris Geographical Society, and other scientific bodies contributed to an important extent in the organization and equipment of the party.

Dr. Charcot expects to be absent about two years. His vessel is 41 metres long, 9.20 metres broad, and has a tonnage of 800. She was built to withstand great ice pressure. He will make his winter quarters on that part of the Antarctic continent which most nearly approaches South America, at Port Charcot, where he spent the winter of 1903, about 500 miles south of Cape Horn. He hopes next year to go on to Loubet Land to begin his exploration of the regions to the south.

His scientific staff includes Mr. Bougrain, who will make the astronomical observations; Mr. Rouch, specialist in meteorology, and oceanography; Mr. Godefroy, who will study the hydrography of the coast and the tides; Mr. Gourdon, geologist; and Dr. Jacques Liouville, marine zoologist and botanist. Six automobile sleds will, it is hoped, enable the expedition to make its way well into the interior along the glaciers and supplement the services rendered by the skis. If practicable, Dr. Charcot intends to travel to the south pole, or as near as possible, but this is by no means the main purpose of his expedition. One

of his objects is to bring back specimens of the fossils in Graham Land to which Dr. Nordenskiöld has already called attention.

MORE DETAILS OF COMMANDER PEARY'S PLANS.—Commander Peary wrote to Dr. H. F. Osborn, President of the American Museum of Natural History, from Sydney, Cape Breton, on July 16, that he was leaving Sydney on that day and hoped to reach Cape York about August 1. Outlining his further plans he said:

For some ten days I shall be occupied in the region from Cape York (76 degrees north latitude) to Etah (about 79 degrees north latitude), taking on board my Eskimos with their dogs, and hunting walrus for my meat supply.

About the middle of August, after replenishing the coal supply of the *Roosevelt* from the auxiliary steamer *Erik*, and putting down a coal depot at Etah, the *Roosevelt* will part company with the *Erik*, turning south for home.

I shall then endeavor to force the *Roosevelt* through Kane Basin, Kennedy Channel and Robeson Channel, to winter quarters at Cape Sheridan on the north coast of Grant Land. I hope to get my ship to Cape Sheridan not later than September 15.

Early in February, 1909, I shall leave the ship with dogs and sledges, in the effort to reach the Pole across the ice of the central Polar Sea.

Returning I shall probably come down upon the northern coast of Greenland, and follow that coast back to the *Roosevelt*, which should be reached about the end of June, 1909.

If the sledging journey has been successful the *Roosevelt* will then force her way south the latter part of July, and I shall hope to get in touch with the world again in September or October of 1909.

Should the effort of the spring of 1909 prove unsuccessful, I have supplies and equipment with which to remain another year, and make a second attempt in February, 1910.

Details of the movements of the expedition (as far as the imperfect communication of the North will permit) can be obtained from Mr. H. L. Bridgman, secretary and treasurer of the Peary Arctic Club.

VARIOUS.

THE GEOGRAPHEN-KALENDER FOR 1908.—The latest edition of this annual (807 pp.) opens with a biographical sketch in German and French of Dr. Hermann Wagner, the renowned Professor of geography at the University of Göttingen, written by Prof. Wilhelm Sievers and accompanied by a portrait.

Thirty-six coloured maps illustrate the sections *Geographische Chronik* and *Geograph. Forschungsreisen.* The references on the map margins to the text relating to the maps is a convenience first appearing in the present issue. The notices of the geographical literature of 1907 fill 88 pp., the list of new maps and atlases 22 pp., obituary notices 25 pp., list of professorships and societies relating to geography and kindred sciences 254 pp., and of geographical and related periodicals 57 pp. The indexes are copious.

SCIENTIFIC KITE FLIGHTS.—Mr. Cleveland Abbe, Jr., writes to *Science* (No. 711) that on October 3, 1907, one of the international dates for scientific kite flights, the Weather Bureau observers at Mount Weather, Va., succeeded in raising a meteorograph to an altitude of 23,110 feet above mean sea level by means of kites. At that altitude the wind was WNW, the temperature -5.4° F. For the flight 37,300 feet of piano wire were used and the number of kites required to lift were eight, having a total lifting surface of 505 square feet.

STUDYING THE UPPER AIR ON THE VICTORIA NYANZA.—Early in July Professor Berson reached Dar-es-Salaam, on his way to Victoria Nyanza to engage in kite-flying and sending aloft *ballons sondes.* The International Commission, of which

Professor Hergesell is President, had planned to make similar researches at Spitzbergen, Sicily, Zanzibar, and the Seychelles, between July 27 and August 1. Prof. Berson informed the *Deutsch-Ostafrikanische Zeitung* that his work would begin on those days and continue for about three months. As it would be almost impossible to recover ballons sondes in a tropical wilderness, the work would be carried on from the deck of a steamer which had been placed at his disposal. The rubber balloons with self-registering instruments would be released while on the lake far from land very early in the morning. He believed that most of the balloons would be recovered as they dropped to the water. This is the first time that an effort has been made to study the conditions of the upper air in tropical latitudes of the far interior of the continents.

NEW MAPS.

AFRICA.

AFRICA.—Gliederung Afrikas nach physikalischen und wirtschaftlichen Gesichtspunkte. Scale, 1:60,000,000 or 946.9 statute miles to an inch. (7 Maps of the Continent.) Von Siegfried Passarge. *Petermanns Mitt.*, No. 7, Gotha, 1908.

Supplements a paper in *Pet. Mitt.* (Vol. 54, Nos. 7 and 8) by Prof. Dr. Passarge: "Die natürliche Landschaften Afrikas." The maps are: 1. Geologische Gliederung, 2. Orographische Karte, 3. Orographisch-morphologische Gliederung, 4. Die Abdachungen und Abflussverhältnisse, 5. Vegetation und Verwitterung, 6. Natürliche Landschaften, 7. Wirtschaftsformen.

ALGERIA.—Le Chemin de Fer de Tlemcen à la Frontière Marocaine. Scale, 3.3 statute miles to an inch. *Bull. Com. de l'Afrique française,* Vol. 18, No. 6, Paris, 1908.

Shows the Western part of the railroad from Oran to the Eastern border of Morocco, with a profile of the line from Tlemcen to the frontier.

GABOON.—Carte du Nord du Gabon. Parts 1 and 2. Scale, 15.5 statute miles to an inch. *Renseignements Coloniaux,* No. 6, Paris, 1908.

Supplements a paper: "Le Cercle de la Côte Nord au Gabon," by Lieut. Poupard and Mr. Bret. A sketch map in black and white showing itineraries, aneroid altitudes and many place names. Based upon astronomically determined points, it supplies much new material for the maps.

FRENCH CONGO.—Itinéraires de la Mission du Haut Logone 1906-1907. Scale, 65 statute miles to an inch. *Renseignements Col.,* No. 6, Paris, 1908.

A black and white sketch map showing itineraries and points astronomically fixed by the Mission of the upper Logone.

SAHARA.—Bassin de l'Igharghar et Itinéraires au Sud du Ahaggar. Scale,